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To The Honble & Revd

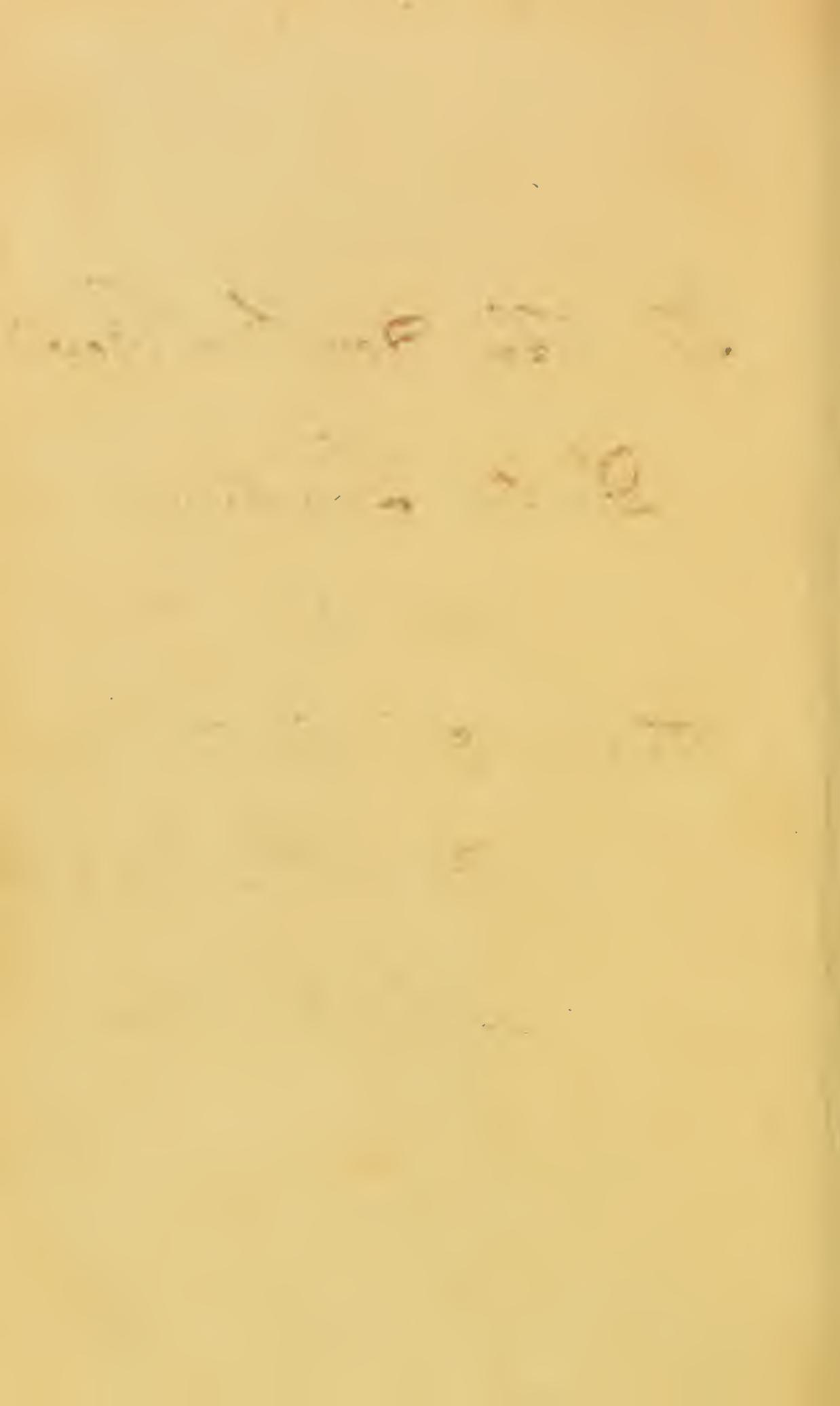
Doctor Lindoay

He & Co

From His Excellent

Humble Servt

The Author.



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AN
ESSAY
ON THE
CHEMICAL ANALYSIS
AND
MEDICINAL PROPERTIES
OF
SODA WATER
AND OTHER
ARTIFICIAL ACIDULATED
MINERAL WATERS,
WITH SOME OBSERVATIONS ON THE NATIVE
MINERAL SPRINGS OF
IRELAND,

By ARTHUR CLARKE,

Member of the Physico Chirurgical Society, Chemist and
Extra Surgeon to the Civil Branch of his Majesty's
Ordnance in Dublin, and Apothecary to St. George's
Dispensary and Fever Hospital.

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1803.

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TO THE
HONORABLE AND REVEREND
CHARLES LINDSAY, D. D.

*Private Secretary to his Excellency
THE LORD LIEUTENANT.*

SIR,

WHEN I determined upon publishing this little Essay, I was anxious that it should be introduced to the world under the sanction of your name, conscious as I was that a publication so recommended could not fail of meeting a favourable reception.

Your devoted attachment to the arts and sciences which from your early years you have so successfully cultivated, as well as the encouragement

ment they are sure to receive from the Government with which you are connected, point you out clearly as a person whose patronage must be highly honorable to any Author, and whose candour would look with indulgence even on the feeble attempts of an inexperienced writer. At the risque of offending that modesty which always accompanies superior merit, I must say that there are few persons who enjoy the honor of your conversation without adding to their knowledge, and I cannot but admire that amid the active discharge of so many important obligations, you found leisure for the acquisition of such various and extensive information.

But independent of these considerations, I have another motive for putting this little production under your Patronage. The profits of the Sale are to be appropriated to St. George's Fever Hospital, of which you are President, and were from its foundation one of its principal promoters. You quickly perceived that such an establishment was a desideratum in this populous City—You did not hesitate to receive that infant Institution under your fostering care, and hundreds may now bless that hand which was stretched out to rescue them from destruction.

Your interference obtained for it the protection of your Noble Relative who fills with such distinguished ability the high office of Chief Governor of this Country; a character which no Irishman can contemplate without veneration. Under whose administration Ireland has arrived at a height of prosperity, the most sanguine of her Patriots never dared to hope for. Whose conciliating spirit has silenced jarring faction and extinguished the last embers of civil dissention—Whose benevolence like the providence of Heaven makes no distinction of Sect or Party,

Amid the gloom which obscures the political horizon, it is a consolation to us to reflect that while LORD HARDWICKE remains amongst us a people united under a beloved Viceroy have nothing to apprehend from the daring attempts of an implacable foe. I cannot refrain from remarking a singularity attending this Nobleman and his illustrious Consort, that even malice which usually points its arrows at the most distinguished characters has respected theirs, and that they enjoy that unanimity of praise which is so rarely the meed of *living* merit.

I am not apprehensive that any thing I have said should be mistaken for the common place language of a Dedication: I have only echoed

the public opinion, and permit me Sir to add that high rank unaccompanied by that virtue which is its noblest ornament would not have called forth the applause even of the humble individual who has the honor to subscribe himself

Yours very truly

and obliged Servant,

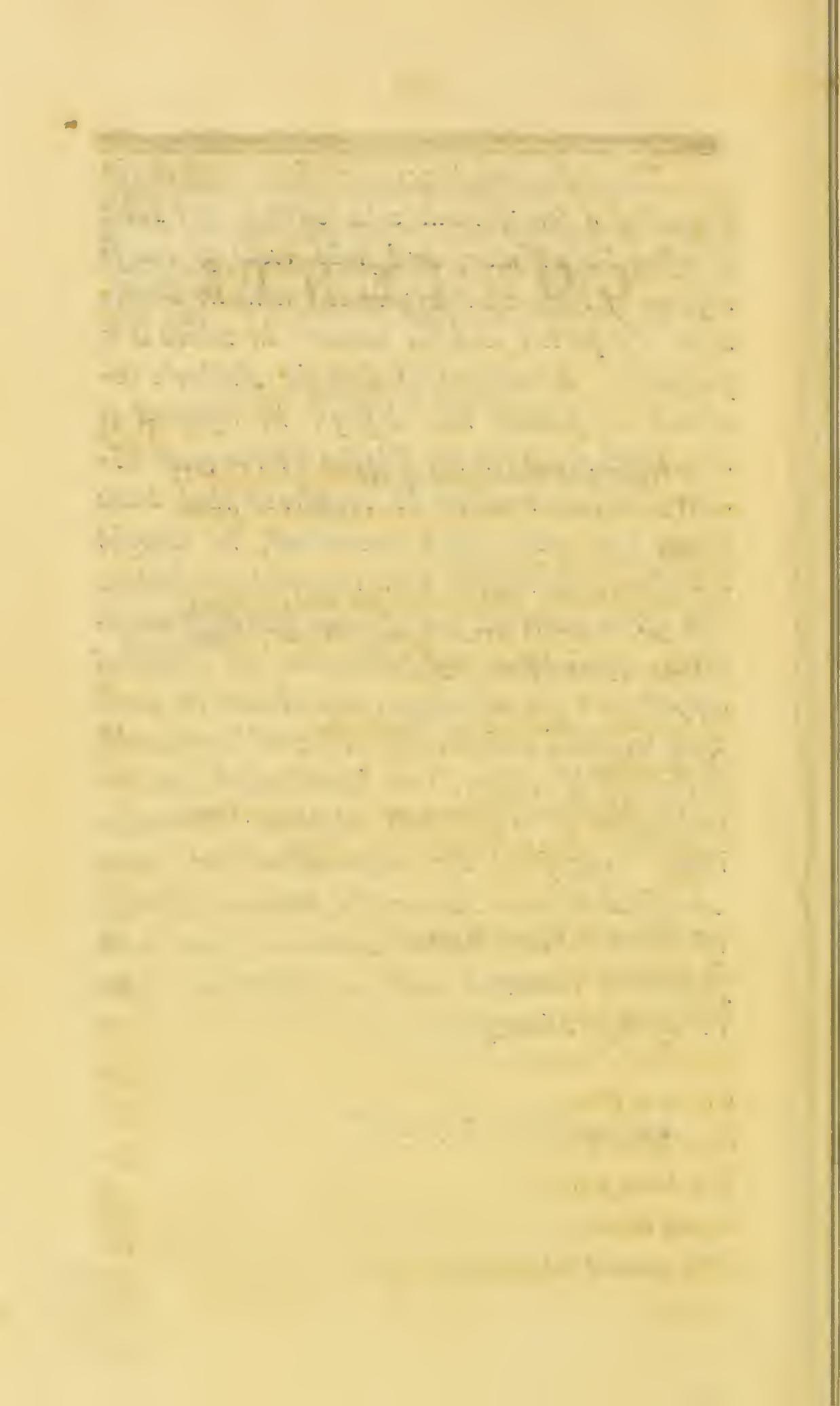
ARTHUR CLARKE.

Gardiner's Place,

July, 1803.

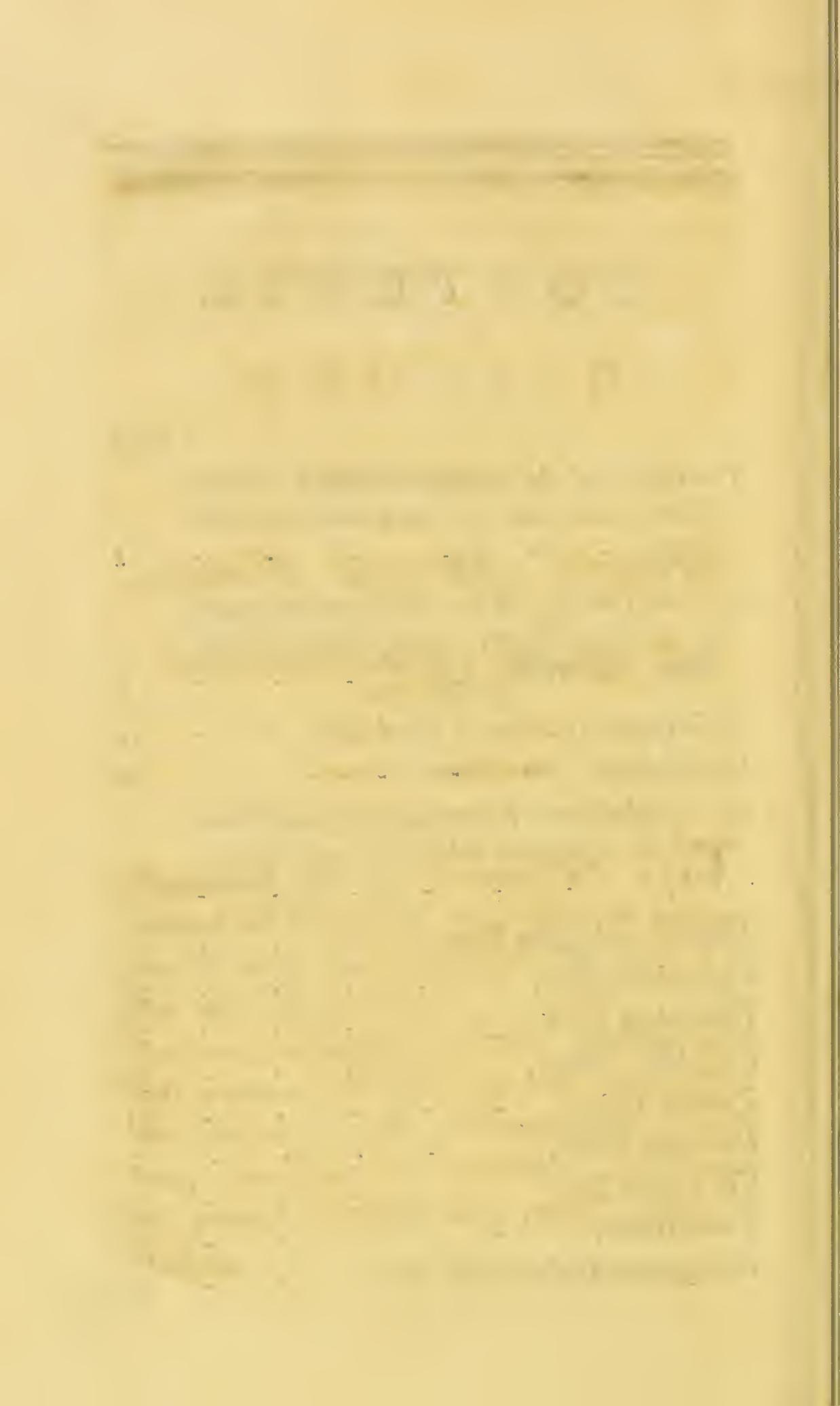
The following pages were drawn up at the request of a few friends who were in the habit of using Soda Water, and who were of course desirous of being made acquainted with its Medicinal Properties and the manner in which it is prepared. It was not at first the Author's intention to publish this Essay; he designed it as a Dissertation for the Physico Chirurgical Society; however when he considered that Soda Water was now in such general use, he thought that some information with regard to its Nature and effects could not fail of being generally interesting, especially as most publications on Chemical Subjects are too voluminous and abound too much with technical and scientific terms to be agreeable to the bulk of readers, who have neither time nor inclination to read such elaborate Treatises. With regard to the observations on other Artificial Waters and on the Mineral Springs of Ireland; the Author conceives them to be sufficiently connected with his subject to render an apology unnecessary.

Gardiner's Place, July 1803.



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THE
HISTORY
OF THE ORIGIN OF
Artificial Mineral Waters,
AND THEIR FIRST INTRODUCTION INTO
PUBLIC USE.

TILL the beginning of the seventeenth century we read of no account of the analysis of Mineral Waters—Seltzer and other Waters of that description, were then for the first time analized, and their properties ascertained by Hoffman, Bergman, and others.—Since that period, several ingenious men, to confirm their experiments, combined the constituent parts of these Waters, and thereby obtained by

artificial means a compound in most respects similar, but in its effects superior to the natural production.—To this too was added the additional motive of being able to supply the want of the native waters in places and at times where these could not be procured.

The illustrious Bergman in his Treatise on Mineral Waters has given some good directions for the method of preparing them artificially, but in some instances the process he recommends is imperfect and liable to objection. Where the Water to be imitated is only a solution of some neutral Salts, such, for instance, as the Epsom Water, Sedlitz, or Sea-water, all that is necessary to know is the proportion in which they are contained in the natural spring; but the process of nature are not always imitated with so much ease, when water is to be impregnated with air, it is a matter of great difficulty to saturate it to the same degree as is found in some of the most powerful Mineral Springs. This every Chemist knows to be an object difficult to be attained, and perhaps impracticable with any of the common apparatus now in use, but under particular management it has been attained, and some of the late specimens of the artificial acidulated Mineral Waters appear fully equal

equal in this respect to the natural waters of Pyrmont and Seltzer. Saline and Chalybeate principles may be easily added, and the imitation will be complete for all medical purposes.

For the discovery of artificial Mineral Waters we are indebted to Cavendish and Doctor Priestly. They were undoubtedly the first who so far improved upon the discoveries made by themselves and others in relation to the principal denominated fixed air, as to contrive an easy method of impregnating water with it. The first idea of this kind occurred to Doctor Priestly, in the year 1767, and in the year 1772, he communicated to the public the process of impregnating water with fixed air, by means of Chalk and Vitriolic Acid, a method now commonly practiced in the preparation of Soda and other artificial acidulated mineral waters.

The Medicated Springs are given bountifully by the hand of nature—they have been resorted to from the earliest times, and from their beneficent effects have deservedly acquired great celebrity.—In places distant from those natural springs, Chemical Analysis has supplied us with artificial combinations which have the advantage of being prepared at pleasure and at a

small expence, and are even in some cases superior to the natural Mineral Waters, whose properties may be changed by carriage and other circumstances—besides their fixed air they contain saline particles of a disagreeable flavour which contribute little or nothing to their medicinal virtue, and may in some cases be hurtful.

Few Mineral Waters have acquired a higher reputation than SODA WATER, and we may add that few deserve greater consideration from the real medical virtues it possesses, and from the variety of disorders to which it is applicable. From its agreeable taste, and the exhilarating effects which it produces on the spirits, it is largely used at table as a common beverage instead of cyder, ale, or other fermented liquors, in this country and Great Britain. How useful and necessary must it therefore be, from the circumstance of its agreeable flavour, (which is no small recommendation) to those patients whose palates have been vitiated by confinement, and whose stomachs have been debilitated by disease.

Of Soda Water and its analysis, and the analysis of
 Rain Water, River Water, Spring Water, Sea
 Water, &c.

SODA WATER is a solution of the Salt of Soda in distilled water, in proportion of about two drachms of the former to a pint of the latter, superfaturated with fixed air or carbonic acid gas.

The capacity which water has of holding a variety of substances in solution is a fact well known and understood, for instance, River Water will dissolve salt, after which it will receive a certain quantity of sugar, another of alum, and perhaps other substances without increasing its bulk or dimensions, but only adding to its weight, owing to their being certain spaces unoccupied between its particles, arising from spherical figure, so that when it is saturated with one, it will mechanically receive other bodies, after which it will unite with more substances chemically, and when saturated with fixed air, will dissolve iron and other bodies that it would not otherwise have acted upon.

This property renders water a most excellent vehicle for substances beneficial to the animal œconomy. Its insipidity and want of smell, render it inoffensive to the senses; its porosity renders it an universal and useful menstruum: its fluidity, the most commodious vehicle for nutritious matter, and its penetrating and solvent power, the fittest attenuant to enter the small vessels of the human body.

The quality of the water to be used should be considered as a circumstance of the greatest importance, both for the preservation of health and the cure of diseases, and it was for this reason that *Hippocrates* paid so much attention to this subject.

The books ascribed to this great man are numerous, among which there are several written on diet and drink: subjects which attracted his attention more than all others; from his reckoning alterations in the diet and air, to be the most prevalent causes of disease: this made him exceedingly cautious in the choice of these, and his practice to turn almost wholly on that opinion; it was so much his wish to be considered the author of *Dieterics*, that he said, the ancients had written almost nothing concerning the diet of the sick, although it was one of the most essential

tial parts of the art. He took a good deal of pains to distinguish between good and bad waters, and said that the best were clean, light, without smell, and taken from fountains that face the east.

The change of air has frequently received the credit of a cure which was entirely owing to the change of water, and many times unsuspectedly, the gradual and permanent application of particular waters, have originated and laid the foundation in early infancy of Chronic diseases and peculiarity of constitution. Many are of opinion that the large Glandular Swellings on the neck of the inhabitants near the Alps in Switzerland and the Peak of Derby in England, proceed from the impurity of the water in these countries; Dr. Cleghorn observes, that in Minorca, indigestion, swelled abdominal viscera, obstructed livers and spleens were produced both in men and brutes, by the badness of the water; and Dr. Perceval in his Essay on Water says, " I have reason to imagine that the common swellings of the Lymphatic Glands, owe their diseased state to the water which the patient drinks. In these cases as well as in many Chronic pains of the stomach and bowels, a course

" of distilled water might be as beneficial as the
 " most celebrated Mineral Waters are in many
 " other disorders, and might prove no inconsi-
 " derable addition to the Materia Medica.*

The most salubrious waters are those that contain most ærial particles, and are lighter than others—hence the best waters when shaken shew numerous bubbles like pearls on the side of the glass—when very highly empregnated with air, they become aciduleus as the Soda and Pyrmont Waters, and can with difficulty be restrained in bottles.

Till very lately water was considered by natural Phylosophers as a simple body, and clasped among the elements. Within these few years Chemists have proved by experiments, that water is a compound body consisting of two principles—and it has been ascertained both by composition and de-composition, that one hundred parts of water are found to consist of eighty-five parts of OXYGEN GAS,* and fifteen of HYDRA-

GEN

* This Water has now obtained a place in the London, Edinburgh, and Dublin Pharmacopeias.

† Oxygen is the acidifying principle of acids, and is the base of pure or vital air, now called Oxygen Gas—this Gas is also one of the constituent parts of the atmosphere of which it forms twenty-seven parts in the hundred.—Hydrogen is the base of inflammable air.

" See Lavoisier's Elements of Chemistry."

GEN GAS—these Gases in the above proportion when chemically united and reduced from the form of an air to that of a liquid, constitute the fluid

W A T E R.

WATER as generally met with, and even rain-water is not strictly pure, but impregnated with various heterogeneous particles. It is requisite therefore, that it should be purified before it is used for experiment—this is effected by simple distillation—for thus the earthy parts are left behind in the body of the still, and after the first runnings are thrown away, the pure water flows into the receiver, which is left to stand some time exposed to the air to remove the empyreumatic flavour which renders the taste unpleasant, and prevails in a greater or less degree, according to the impurity of the water before distillation. Water obtained by a process of this kind has not suffered the least decomposition, and is termed *simple distilled Water.*

Distilled Water is seldom employed to any extent in culinary purposes, or in manufactures, on account of the trouble of procuring it in

large quantities—but for preparing a great number of medicines, and in the more chemical processes it is an essential requisite, particularly in the Artificial Mineral Waters, as it imbibes fixed air faster, and retains it in greater quantities than other water.

RAIN WATER.

THE next in purity to distilled water is that which is supplied by the clouds, or in other words, that which has undergone a natural distillation from the earth, and is condensed in the form of rain.—This is a water so nearly approaching to absolute purity as probably to be equal to distilled water for every purpose except in chemical experiments. The foreign contents of rain water appear to vary according to the state of the atmosphere through which it falls. The heterogeneous atmosphere of a smoaky town will give some impregnation to rain and although these particles cannot be at once detected in chemical examination, they will

will yet render the water liable to spontaneous change, and hence rain water if long kept especially in hot climates, acquires a strong smell, becomes full of animalculæ, and in some degree putrid.

SPRING WATER.

UNDER this class are included all waters that spring from some depth beneath the soil, and are as various in their contents as the substances that compose the soil through which they ascend. when the ingredients are not such as to give any peculiar medical or sensible properties, it is distinguished as a hard or soft spring, sweet or brackish, clear or turbid, and the like. One of the principal inconveniences in almost every species of spring-water is its hardness, owing to the presence of earthy salts, which in by far the greater number of cases are only the insipid substances chalk and selenite, these do not impair the taste of the water, whilst the air which it contains added to its grateful coolness, render it very agreeable to the palate. The quantity of earthy

salts varies considerably, but in general it appears that the proportion of five grains in a pint will constitute a hard water, unfit for washing with soap and for many other purposes of household use and manufactures.

RIVER WATER.

This is in general much softer and more free from earthy salts than the last, but it contains less silt of any kind, since by the agitation of a current, by that increase of temperature which it derives from its exposure to the atmosphere, common air and carbonic acid gas are disengaged, the taste thereby becomes not so harsh, but less fresh and agreeable—and the waters of the hardest springs are often converted into a stream sufficiently soft for most domestic purposes.

STAGNANT

STAGNANT WATERS.

THE Waters that present the greatest impurities to the senses, are those of stagnant pools and low marshy countries.—They are filled with the remains of animal and vegetable matter, undergoing decomposition, and during that process becoming in part soluble in water, thereby affording a rich nutriment to the succession of plants and insects, which the œconomy of nature is perpetually substituting in the place of those that perish. The noxious effects produced by the neighbourhood of marshes and stagnant pools upon the human frame, are occasioned no less by the internal use of the water than by the corruption of the surrounding atmosphere, in consequence of which, especially in hot climates, a residence near those places is as much to be condemned on the one account as on the other—and in like manner, an improvement in health, has been as much attributed to a change of water as a change of air.

CARBONIC ACID GAS,
OR FIXED AIR.

Chemists at an early period had noticed the two-fold state in which alkaline salts are found, and accordingly had termed them *fixed* or *caustic*; but it is only known since the experiments of Doctor Black of Edinburgh, that the different states in which these substances appear depend upon the presence or absence of the basis of that Gas which he denominated *fixed air*. Modern Chemists have made further discoveries upon this subject, and have proved that fixed air is a true acid of a peculiar kind, which because it was found in the atmosphere received the name of aerial acid, but since it has been discovered that it consists of Oxygen and Carbon*, it has been termed Carbonic Acid Gas—the proportion of its constituent parts are twenty-eight parts of Oxygen and seventy-two parts of Carbon in the hundred.—See Fourcroy's *Chemistry*, vol. 3.

This

* The Word Carbon is adopted from the nomenclature of the French Chemists to express an inflammable matter which constitutes the chief part of the weight of Charcoal.

This acid occurs not only in those compound states we have mentioned, but likewise in various other ways—thus we find it in many mineral waters, which from the peculiar taste communicated to them by this acid, are termed *Acidulous Mineral Waters*—it is also found in a gaseous or very pure state, in a great number of subterraneous passages—it occupies a hundredth part of the atmosphere, and is frequently generated and disengaged during the change and decomposition of vegetable and animal matter.—Finally, we obtain it artificially by the decomposition of fixed or carbonated alkalies, or which answers the same end by dissolving Pot-ash Chalk, or Marble-sand in acids, or by decomposing those bodies by fire.

Carbonic Acid Gas occasions an appearance of briskness in water similar to that of Champaigne, Cyder, or bottled Ale, which is chiefly observable when the water is poured from one vessel into another—it is very volatile and soon escapes on the water being exposed to the air; it is, perhaps, the most generally diffused acid in nature. Among the most useful of its properties is the antiseptic quality which it possesses in a very high degree. Water impregnated with this acid is capable of dissolving Iron, and is

is likewise capable of holding in solution a large quantity of Rochelle, Epsom, and other neutral Salts, and in this way are formed *Artificial Mineral Waters.*

SALT OF SODA.

SALT OF SODA, although generally considered as an alkali, is a neutral salt consisting of Carbonic Acid and pure Soda. In Hungary, Egypt, Persia, the East Indies and China, it is found ready formed on the surface of the earth, it is likewise found in a great many mineral waters, and on old walls—but as this native salt is never completely saturated with the Carbonic Acid, it is necessary to have recourse to art to obtain it in that state. This salt is likewise procured by the lixiviation of marine plants, and especially from the herb *kali*, whence is derived the name *alkali*, given to this substance by the Arabians.

Salt of Soda is employed in several of the arts and manufactories, of glass, soap, &c. and in the preparation of some of the Artificial Mineral Waters.

OF THE

MEDICINAL PROPERTIES

OF

SODA WATER,

AND THE

Diseases in which it is most Serviceable.

FEW Natural Mineral Waters have acquired a higher reputation than this artificial preparation, and few deserve greater consideration from its medicinal virtue, and from the variety of disorders to which it is applicable.

It is a saline water slightly alkaline, highly acidulated with carbonic acid gas, containing more of this volatile principle than is sufficient to saturate the alkali, and hence it is somewhat acidulous to the taste, and shews the presence of an

acid, by chemical tests, (a pint of this water contains upwards of thirty cubic inches of entirely pure carbonic acid gas,) Soda Water when exposed to the air, and having lost its superabundant quantity of carbonic acid, like most other waters becomes putrescent, and strongly fetid in a very short time, it requires therefore to be kept closely corked and the mouth of the bottle covered with a cement to prevent the escape of the carbonic acid, for as long as this antiseptic acid remains the water continues perfectly sweet.

The effects of this Water when drank in moderate doses, are to raise the spirits and encrease the appetite, it produces no particular determination to the bowels, as its saline contents are in very small quantities, but it pretty certainly acts as a diuretic. It is chiefly to the strong impregnation, with carbonic acid and to the small proportion of Soda which it contains, that we are to look for the explanation of the very important benefits which are derived from it in a variety of disorders.

The cases for which Soda Water may be used with a prospect of almost certain advantage seem to be the following:

It is particularly serviceable in relieving some of the symptoms that indicate a morbid affection of the lungs in slow hectic fevers, attended with frequent flushing and profuse night sweats, and with constant cough and foetid purulent expectoration. It will often in a high degree, check the violence of the perspiration, diminish the discharge from the lungs, and correct its foeter, and under the operation of this Medicine, the patient will for a time be able to gain more tranquil nights and an improved appetite. From this excellent property of allaying feverish irritation, this water may be also successfully applied in many anomalous cases where a tendency to hectic fever is suspected; it has been used with great advantage in the late *Influenza* that raged in this City.

Another class of disorders to which Soda Water often brings considerable relief is in those eruptions of the skin that are attended with general irritation, which were formerly ascribed to a scorbutic acrimony of the humours. Miliary eruptions, and all those that are not merely local, and with which the stomach strongly sympathises, often give way to the use of this water.

From the nature of both the active component parts of this water, viz. Soda and Carbonic acid,

we might expect great benefit from its use in various derangements of the alimentary canal, and accordingly we find that foulness of the stomach, bilious vomiting, acidity and heartburn, spasmodic pains in any part of the intestines, are the symptoms to which this medicine brings the greatest relief

On account of the property of this artificial water in relieving spasmodic pains, and from its rapid determination to the kidneys, and perhaps its alkaline contents, it is sometimes employed with great advantage in diseases of urinary organs, as stone and gravel. A large proportion of the Soda Water used in this Kingdom and in Great Britain is for the relief of those disorders.

Lastly, in Gouty habits the daily use of this water as a table drink in lieu of fermented liquors has proved to be the best antiarthritic yet discovered.

The usual dose of this water for grown persons is from half a pint to a pint twice or three times a day; it may be drank freely in most cases and requires less precaution in its exhibition than most

of the other Mineral Waters, whose sensible properties and medicinal powers are so considerable. From its pleasant taste and the exhilarating effects which it produces on the spirits, it is now universally and largely used at table as a common drink.

The various Earths, Metals and Salts, along with their several combinations form the most important of what may be considered as the proper foreign contents of Mineral Waters or those with which the water becomes impregnated when flowing beneath the surface of the earth. When they flow within a channel over the surface of ground they often become much changed in their chemical composition; some losing part of their contents in evaporation, others by slow deposition, or by being decomposed through the influence of the light and air; at the same time they often acquire new contents which are furnished by the soil over which they flow. Thus the Sulphureous Springs of *Harrogate* derive their nauseous flavour in a great degree from the decayed vegetable matter contained in the foetid marsh from which they take their rise, as well as from the Myriads of Animalcule which generate and putrify in a situation so well calculated for their habitation and subsistence.

Several of the most valuable natural springs contain substances which are either useless, or positively detrimental. *Pyrmont Water* for instance contains thirteen grains in the pint of calcareous Salts which render it very hard, and hence it may prove inconvenient to some constitutions. Other natural waters contain so little of their active ingredients as to require often an inconvenient bulk of liquid to produce the desired effect. As for example, when *Scarborough* or *Epsom Waters* are used as purgatives. All these defects may be remedied in the artificial preparations, by leaving out the useless and noxious matter, and increasing that in which the proper medicinal virtue resides. Art likewise can prepare out of the same materials new compounds which would be considered as valuable natural treasures were such found. Of this kind I should reckon a moderately dilute solution of Neutral Salts; *Epsom* or *Rochelle Salts* for instance, supersaturated with Carbonic acid gas. This forms the

ARTIFICIAL ROCHELLE AND EPSOM WATERS,

and makes a very valuable addition to their powers as medicines; from the known operation of this gaseous

gaseous acid in quieting irritation of the stomach, and rendering the surface of the body more cool and perspirable, and besides it powerfully corrects the nauseous taste which is in many instances a material objection to the neutral salts, especially to a daily use of them as a gentle evacuant and alterative.

As these waters are a speedy and safe purgative, and as under their use, the general health, spirits and appetite almost invariably improve, they may be used with the greatest advantage in correcting the obstinate costive habit of body that accompanies Hypocondriasis, and this habit when removed by Mineral Waters appears to be less liable to return, than when only the resinous and drastic cathartics are made use of.

*The Strongest of all the Natural Saline Waters that
are used Medicinally is*

SEA WATER.

THREE distinct salts were found by Bergman in his chemical examination of this water in the following proportion: a pint contained 241 grains of Muriated Soda or common Salt, 65 of Muriated Magnesia and 8 of Selenite.

From the quantity of its saline contents, viz., 314 grains in a pint, it possesses very stimulating powers, and therefore is injurious in those diseases or constitutions where there is a general fever or hectic tendency. Among the sensible effects which succeed a moderate dose, may be particularly mentioned that of thirst; it seldom excites nausea, except in very irritable stomachs. When used internally, it should be taken in such doses as to prove moderately purgative, about a pint is generally sufficient, and this should be taken at two doses, with an interval of about half an hour

hour between each. This quantity contains about half an ounce of purgative salt of which about three fourths are muriated salt. However there is very little danger even to be apprehended from an excessive dose of Sea Water, or even of its basis common salt. We read in the Medical Transactions, Vol. I. that a man troubled with Bott Worms, accompanied with a continued constipation of fourteen days, took two pounds of common salt, dissolved in two quarts of water, within an hour; its operation was violent to a degree, and many worms were discharged both upwards and downwards, the dose was repeated the third morning which had the same effect; less doses were taken at intervals and the person was cured. Dr. Rush orders only thirty grains of salt to be taken every morning fasting against the worms, and a tea or table spoonful every day as a refrigerant against spitting of blood.

The disorders for which the internal use of Sea Water has been resorted to are in general the same for which all the simple saline waters may be used; its internal use is chiefly made an auxiliary to its very extensive external application.

Sea Water is in high estimation for Scrophula in *King's Evil*, in indolent tumors in the glands

of the neck and other parts of the body that are slow in ulcerating, and alway tedious in their cure. Dr. Cullen in treating of *Scrophula* says, " with regard to the choice of Mineral Waters " most fit for the purpose, I cannot with any " confidence give an opinion. Almost all kinds " of Mineral Waters, whether Chalybeate, Sul- " phureous, or Saline have been employed for " the use of *Scrophula*, and seemingly with equal " success and reputation." A circumstance which led him to think that if they are ever successful it is the elementary water that is the chief part of the remedy. However the efficacy of Sea Water above all others in this disease, require hardly any other proof, than an attention to the great resort of company to the different watering places, for at no former time were those places in such great estimation as they are at present in this country.

The best regulation for the use of Sea Water is to procure it as far from the shore as possible, within an hour of high water and at a distance from the mouth of any river. Many people mix with it an equal quantity of fresh water which will prevent its producing so much thirst, render it more palatable, and keep it within the bounds

of

of a moderate evacuation. When the patient cannot go to the sea we can make *Artificial Sea Water* by dissolving three ounces of common with one ounce of Epsom Salts in six pints of water.

CHELTENHAM WATER,

A gallon of this purging Chalybeate Water according to Dr. Fothergill's Analysis contains 480 grains of crystallized salt, composed of vitriolated Soda and vitriolated Magnesia, 5 grains of muriated Soda, 25 grains of muriated Magnesia, 40 grains of Selenite and 5 of the oxyd of Iron, together with 30 cubic inches of Carbonic acid gas and a small quantity of Hepatic gas. Total 555 grains of solid contents, with a pint and half of the aeriform.

Cheltenham water contains more salt than most of the Saline Mineral Waters, Sea Water excepted, by far the greater part of these salts are of a purgative kind, and therefore an action on the bowels is a constant effect produced by this spring.

Cheltenham Water is also a Chalybeate, and if the analysis before us be accurate, it is one of the strongest we are acquainted with. The Iron is suspended by the Carbonic acid, of which gas the water contains about one eighth of its bulk. As this water does not keep well, nor bear transporting to any distance without being materially altered, and as the spring has been calculated to yield only thirty-five pints of water in an hour, a quantity scarcely sufficient to supply the demand of the drinkers; to obviate this inconvenience we must have recourse to art, which supplies us with a preparation called

CHELTENHAM SALTS,

This is in fact nothing more than a mixture of the vitriolated Soda and vitriolated Magnesia,* two drachms of the compound with a small quantity of muriated Soda added to a pint of water impregnated with Carbonic acid gas and Iron, form the *Artificial Cheltenham Water*, which possesses all the properties of the Natural Spring.

Cheltenham

* See D. Curwen's Treatise on Mineral Waters.

Cheltenham Water when taken in a moderate dose acts speedily as a Cathartic and in a very gentle manner without occasioning griping or leaving that faintness and languor which often follows the rougher Cathartics, during its use, which in most cases may be continued for a considerable length of time, the appetite will be improved, the digestive organs strengthened and the constitution invigorated. It is used with considerable benefit in a number of Chronic diseases, in Glandular obstructions, especially those that affect the liver and the organs connected with the functions of the alimentary Canal. Persons who have injured their biliary organs by a long residence in hot climates, and who are suffering under symptoms either of excess or deficiency of bile, receive remarkable benefit from a course of this water judiciously exhibited, it may also be employed with great advantage in the beginning of Drop-sies; in Scrophulous affections it is also recommended, but as these complaints often require the assistance of external application, the Sea has here certainly a very decided preference.

CHALYBEATE WATERS.

As Iron is metal abundant in every part of the earth we may expect to find it as a very common ingredient in the various springs that rise from beneath the surface, and accordingly it is the metal which of all others is met with most frequently in mineral waters, and the most readily detected even in very minute quantities water that holds this metal in solution is called a *Chalybeate Water*.

There are two solutions of this metal which are met with in mineral waters, that in the Carbonic, and the sulphuric acids, and sometimes the same water holds both these salts in solution.

An Artificial Solution of Iron in Carbonic Acid, may be readily made by agitating filings of

of iron in a bottle filled with water saturated with this Acid Gas, and this solution is in imitation of

PYRMONT WATER.

THIS Artificial Chalybeate Water is known to possess all the sensible properties and valuable medicinal virtues of the celebrated Chalybeate Spring at Pyrmont, known over most parts of Europe.

The Artificial Pyrmont Water is considered as a powerful tonic, and highly useful in indigestion, weakness of the stomach and various female complaints. It may be taken in the quantities of half a pint twice or three times a day, mixed with new milk or a small quantity of wine.

HARROGATE WATER

MAY in like manner be imitated by impregnating a solution of Epsom Salts and Sal Soda with sulphurated Hydrogen or Hepatic gas, (the gas which mineralizes sulphureous springs,) after having first saturated the solution with Carbonic acid gas.

The Mineral Waters have certainly acquired great medical reputation from their containing various active substances. They are stimulant and antiseptic from their Carbonic acid gas; they alter the habit and state of the blood by their sulphurated Hydrogen gas. They promote the evacuations by their saline contents, and they strengthen the body by the tonic and astringent virtues of their metallic impregnations; but then these substances are in such a diluted state that the waters must be as useful from their bulk as from any specific virtue contained in them, because we cannot obtain the same good effects from a much larger dose of the medicating or metallic

lic part by itself. And notwithstanding the prejudices of mankind in favour of natural productions, yet the native Mineral Waters are of no more use in medicine than the same substance dissolved in a large quantity of common water, for Artificial Mineral Waters are of equal importance, or perhaps superior to those found in the earth, by their not being made to contain gypsum or earthly substances, which are at least useless and may in many cases prove hurtful to the stomach.

Having thus given a short account of the chemical properties and medicinal virtues of those Artificial Waters, we shall now proceed to take a view of some of the natural Mineral Springs of Ireland in every province of which they abound.

THE LEIXLIP SPA

Is a hot Spring in the vicinity of this City, discovered in the year 1793. From its tepid quality it was considered to possess medicinal virtues; upon being submitted to analyzation by the

ingenious Dr. Higgins, professor of Chemistry in the Dublin Society, he found this water to contain Muriated Mineral; Alkal Vitriolated Vegetable Alkali, muriated Lime, Magnesia, Argillaceous, and Siliceous earth, with bituminous matter, and a small quantity of Carbonic acid gas. Altho' no Iron was discovered in this water by chemical analysis it bears a ferruginous appearance on its surface, and conveys a strong sense of iron to the taste, and the earth and the stones about the Spring have all the appearance of that metal. From a number of cases related in Dr. Fletcher's account of this Spring, it appears to possess very valuable properties. In bilious vomiting, loss of appetite, lowness of spirits, pulmonary complaints, hectic fever, and cutaneous diseases, it has been exhibited with considerable advantage. It promotes expectoration, gently opens the bowels, and from its effects in some cases of gravel seems to possess a diuretic property. See Dr. Fletcher's account, where he says, " I am happy to find from the various reports of its worth there is a serious intention of properly enclosing this Spa with a suite of appropriate baths, and by adjoining buildings and accommodations to put it upon a footing with BATH itself." The situation is dry, elevated, and well disposed,

with

with a commanding prospect of a most diversified and attracting landscape, and uniting with the virtues of the water itself in the important design of Health.

There is a small Spring of Water in the village of Lucan, which is sulphurated, and is said to be of great medicinal virtue. It is called the Sulphureous Spring, and is said to be of great medicinal virtue.

LUCAN WATER. This is a weak Sulphureous Water, which is sulphurated by the action of the air, and is said to be of great medicinal virtue.

THE Sulphureous Spring in Lucan is a weak Chalybeate Water, strongly impregnated with sulphurated Hydrogen gas; its properties are so well known as to need no description; we shall only mention the diseases for which it is chiefly recommended.

It is used in a number of disorders of the alimentary Canal from the stomach to the intestines, and in the derangements of the biliary Secretions which so often produce these complaints; during its use the general health, spirits and appetite almost invariably improve, and in Cutaneous disorders this water has acquired high celebrity.

The advantages of sulphur as a mild unirritating purgative, and one perhaps that continues its operation through the whole of the intestinal-Canal, has long established its virtues in haemorrhoidal affections; among those disorders for which Lucan Water is often prescribed we may mention the Piles, and symptoms produced by worms. The effects of sulphur in removing worms from the alimentary Canal has been supposed with some probability to be that of destroying the animal, and if this be a just explanation the diffusive activity of the sulphurated Hydrogen gas, which is contained in this water, will amply counterbalance the minuteness of quantity. However this be we find that Lucan Water is a safe and often powerful remedy against the round worm and ascarides; when taken in such a dose as to prove appetient, and in the latter case also, when used as a *lavement* the ascarides being chiefly confined to the rectum, and therefore within the reach of Medicine.

Independant of the Waters now mentioned as the natural productions of this Kingdom, there are various others an account of which may be seen in Rutty's Synopsis on Mineral Waters, to mention only their names would exceed the limits of this Essay. However I cannot dismiss

this subject without remarking on the absurd predilection which so many inhabitants of this Country entertain for the Mineral Springs of England, France and Germany, though every province of Ireland teems with salubrious Fountains, which in Medicinal virtues rival if they do not exceed the most celebrated in other parts of Europe. This interesting fact is candidly admitted by Foreign Chemists and Physicians who have had an opportunity of analysing them, or of observing their effects. The Chalybeate Waters of Castleconnel, Ballyspellan and Drumkitt, are not inferior in efficacy to the Spa in Germany. The hot Spring of Leixlip may dispute the pre-eminence with the boasted Waters of King Bladun ; Swallinbar and Lucan, vie with Harrogate, and the Springs of Mallow are confessedly superior to those of Bath and Buxton. If the valetudinarians who resort annually in crowds to the watering places of Britain could be induced to seek health and amusement in their native Country. Lucan and Mallow would become places of fashionable resort, much useless emigration would be spared and the immense sums which are lavished at Bath, Bristol, Harrowgate and Buxton, being circulated at home would contribute in no mean degree to the industry and civilization of the lower classes of people in this Country.

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